Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – Nov/Dec– 2017**

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| **Code :** | **14EI2048** | **Duration :** | **3hrs** |
| **Sub. Name :** | |  |  | | --- | --- | |  | **INSTRUMENTATION AND CONTROL SYSTEMS** | | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Sketch the fundamental measurement process and explain the generalized measurement system with example. | CO1 | 15 |
| b. | Outline the reasons for having instruments calibrated. | CO1 | 5 |
| (OR) | | | | |
| 2. | a. | Illustrate the construction and working of stripchart recorder. | CO1 | 15 |
| b. | How galvanometer can be converted into a voltmeter? | CO1 | 5 |
|  |  |  |  |  |
| 3. | a. | Discuss the constructional features of Bourdon-tube pressure gauge. | CO1 | 15 |
|  | b. | Explain the working principle of energy meter. | CO1 | 5 |
| (OR) | | | | |
| 4. | a. | [Illustrate the principle of working of thermocouples. State the law of intermedia](http://www.annauniversityplus.com/)te [temperatures and intermediate metals for thermocouples.](http://www.annauniversityplus.com/) | CO1 | 15 |
|  | b. | Explain how the Wheatstone bridge circuit may be utilized for the measurement of temperature. | CO1 | 5 |
|  |  |  |  |  |
| 5. | a. | Describe the working principle of strain gauge bridge with neat sketch and explain the different types of strain gauge. | CO1 | 15 |
|  | b. | Define Gauge factor and identify its significance. | CO1 | 5 |
| (OR) | | | | |
| 6. | a. | Discuss the principle of hotwire anemometer. List its any two merits and limitations? | CO1 | 15 |
|  | b. | Explain the ultrasonic flow meter using the travel time difference method. | CO1 | 5 |
|  |  |  |  |  |
| 7. | a. | Find the overall transfer function of the system for the signal flow graph shown below. | CO3 | 15 |
|  | b. | Outline the basic properties of signal flow graph. | CO3 | 5 |
| (OR) | | | | |
| 8. | a. | Construct Routh array and determine the stability of the system represented by the characteristic equation, s6+2s5+8s4+12s3+20s2+16s+16=0. Comment on the location of the roots of characteristic equation. | CO2 | 15 |
|  | b. | Identify the necessary condition for stability? Explain the relation between stability and coefficient of characteristic Polynomial. | CO2 | 5 |
|  | | **Compulsory:** |  |  |
| 9. | a. | The open loop transfer function of a unity feedback control system is given by. Sketch the polar plot and determine the phase margin and gain margin. | CO2 | 15 |
|  | b. | Reduce the block diagram shown in the figure and find the transfer function. | CO2 | 5 |

ALL THE BEST